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ABSTRACT

Studies investigating selected aspects of children's television viewing are described and the findings are used as the basis of a theoretical formulation in which young children's television viewing is seen as a transactional process similar to other normal information processing activities. According to this formulation, the child's motivation to understand what he or she is viewing is a primary driving force of attention to television. Children develop a sophisticated strategy which allows them to effectively divide their visual attention between television and other activities, such as toy play. This strategy depends heavily on the children's use of program attributes as cues to whether the current content is or is not informative. If the attribute signals informative content, the child pays full attention to the television and actively attempts to understand the program. Attributes such as children's voices, peculiar voices, women's voices, sound effects, auditory changes, applause, and laughter have been shown to elicit and maintain looking at the television. It is argued that the effects of these attributes stem from the information which they provide the child about the likely comprehensibility of the content. For example, peculiar voices on television almost always mean content meant for children. It is suggested that with time, the child comes to learn these characteristics of the television medium and employ them to direct attention. (JMB)

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A Theory of the Active Nature of Young Children's Television Viewing

by

Daniel R. Anderson and Elizabeth Pugzles Lorch

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When a young child watches television in a semi-darkened room, the child may sit quietly and gaze at the TV screen for extended periods of time. This kind of observation combined with demonstrations that children's social behavior can be influenced by television has led many writers in the popular press to suggest that children are passive victims of the television viewing experience. The most common analogy is of television as a narcotic, one that leads to addiction. Once exposed to television, children can no longer help themselves, they must passively ingest this "plug-in-drug."

Many child development specialists hold this same point of view. T. Berry Brazelton, Harvey Lesser, Jerome and Dorothy Singer, among others, have publicly expressed the belief that young children's attention is passively captured and held by the rapidly changing sights and sounds of this dynamic communication medium. Once attention is captured, so this view goes, the child passively incorporates not only the content but the form of television as well. By and large, these popular conceptions of children's television viewing behavior are based on only the most casual observations.

For the researcher interested in cognitive development, television viewing presents an interesting problem. General cognitive developmental theory emphasizes the active nature of children's cognition, but the popular concept of television viewing is passive cognition. It was this problem that, in part, led us to our program of research in watching children watch television. This program of research has led to the

development of our own, rather different, ideas about children's viewing. Our idea is that, contrary to the popular conceptions, children's television viewing is representative of their active cognitive transactions with the environment. Although there are passive elements to TV viewing, there are numerous active elements as well. We suggest that from their experience with television, children develop sophisticated attentional strategies of TV viewing which in part flow from their motivation to understand what they watch. As you might guess from the title of this symposium, these attentional strategies involve the form as well as the content of television.

We were led to this point of view by the results of two recently finished studies which examine the relationship between preschoolers' visual attention to a television program and their comprehension of the program. In the first study which we did with Steve Levin, we had one group of five-year-olds watch Sesame Street with toys in the viewing room and another group watch the same programs without toys. As can be seen from the first slide, children who have an alternative activity to TV viewing typically divide their attention between the TV and the other activity, in this case play with the toys. Children who have no alternative activity usually simply sit and watch TV as shown in the next slide. As in most of our research, we continuously monitored the children's visual attention to the TV by having an observer depress a button when the child looked at the TV and release the button when the child looked away, as shown in the next slide. The times from the beginning of the TV program that the button

was pushed and released were automatically recorded and stored in a computer for further analysis. We thus had a continuous record of the fluctuations in each child's visual attention to the programs.

Now, recall that one group of five-year-olds viewed without toys in the room and the other group viewed with toys. As expected, attention in the group who watched with no toys in the room was nearly double the attention of the children who watched with toys (87% vs. 44%). Following the viewing session, we assessed the children's comprehension by means of cued recall and other techniques. Now, consider two simple theories of the relationship between attention and comprehension. The passive viewing theory suggests that the children have no great control over their attention. The children learn that to which they attend. Implicitly, this passive viewing position holds that the causal relationship between attention and comprehension is from attention to comprehension. This theory would thus predict that the high-attention, no toys group should have greater comprehension than the moderate-attention toys group. An alternative theory suggests that rather than the causal relationship being primarily from attention to comprehension, the reverse causal direction holds. That is, if the program is currently comprehensible, it holds attention. If it is incomprehensible, it loses attention. Keep in mind that we are here considering preschool children; a variety of research indicates that much television may be incomprehensible to such young children. This alternative theory, that comprehension controls attention, predicts that

there should be no difference in comprehension between the no toys and toys groups, but that attention should vary within each group as a function of their comprehension of the program. There should, therefore, be a significant correlation between visual attention to each portion of the program and comprehension of that portion of the program. The results of the study strongly supported this alternative theory: there was no difference in comprehension between the two groups, but within groups, variations in comprehension were significantly correlated with variations in attention (Lorch, Anderson, & Levin, in press).

We now had a strong indication that children's comprehension of a TV program is not simply subject to the whims of factors which affect attention. Rather, it appeared as if children are in control of their own attention, following the rule: pay attention when the program is understandable, and do something else when it is not. But our inference from this study was partially based on a correlational result -- we all know that inferring causation from correlation is a risky business.

What we needed to do was to experimentally manipulate the comprehensibility of a TV program without changing its superficial perceptual characteristics which may act to control attention -- that is, we wanted to change the intelligibility of the content without affecting the form in which the content is presented. We accomplished this in three ways: taking a cue from Andrew Collins' very interesting research, we internally rearranged portions of bits from Sesame Street so that the

sequence of actions should be less understandable. We did this by employing professional electronic editing equipment at a local TV station. For another set of bits we carefully substituted the original dialogue backwards, utterance for utterance, so that the backward speech was lipsynched to the action, containing the same general sound envelope and voice quality, but now unintelligible. For the remaining bits, we used Greek language versions of the bits as supplied to us by Ed Palmer of Children's Television Workshop. We thus created two tapes, which were, in a sense, mirror images of each other. The tapes were identical except that each bit that was normal on one tape was rendered less comprehensible on the other tape, and vice versa. Keep in mind that the tapes were identical in their superficial formal characteristics. They differed only in intelligibility. We then showed the tapes to 2-, 3-, and five-year-old children. If our inference from the earlier study was correct, then we should find that attention drops substantially to the bits that are relatively unintelligible. Overall, the results support the prediction: the children attended less to the bits that were rendered less comprehensible. The effect was primarily due to the manipulations of dialogue; the internal rearrangement within bits had little effect: apparently the children were processing these bits in such small units of perception that rearranging the sequence of major events within the bit did not much affect their comprehension and thus their attention. Nevertheless, we

found that with the dialogue manipulations, attention substantially declines when the program is made less understandable (unpublished data). These findings are further buttressed by William Husson and Bob Krull's recent work showing that attention is higher in the presence of concrete rather than abstract dialogue. These results do not support the notion of children being slaves to the superficial formal attributes of the television medium. Rather, the results suggest that the children are discriminating in their attention. They attend to parts of the program that they can understand.

Before I lay out for you our emerging theory about the nature of TV viewing, I should review for you some findings from our other research. One set of analyses has revealed a general pattern of attention to television which we have called "attentional inertia." Since I presented this finding at SRCD two years ago, I will describe it only briefly here. If one calculates the conditional probability that a look at the TV will remain in progress as a function of time that it has already been in progress, the following curve is obtained, as illustrated in the next slide. As a look at the TV progresses through time, the probability of the look continuing further rapidly increases. The longer a child looks at the TV, the more likely it is that he or she will continue to look. The child's attention thus becomes progressively locked in to the television. This phenomenon is not an artifact of averaging

over individuals -- the same curve appears for each individual viewer. Similarly, if the pauses between looks are analyzed, the conditional probability of looking back at the TV as a function of time since the end of the last look is a decreasing function, as illustrated in the next slide. The longer it has been since the viewer has looked at the TV, the less likely it is that he or she will look back (Anderson, Alwitt, Lorch, & Levin, in press).

In further studies we have found that attentional inertia is not bound to specific content: the longer a look at the TV is in progress prior to a major change in content (as in the transition from one bit on Sesame Street to another), the longer it will, on the average, remain in progress following the change in content, despite the general tendency for content changes to terminate looks.

Our current idea about attentional inertia is that it represents a previously unsuspected attential phenomenon which is the conceptual opposite of habituation. If attentional habituation is the response to a meaningless, static, repetitive stimulus, our notion is that attentional inertia is the response to a meaningful, dynamic, somewhat unpredictable stimulus. We do not believe that this interesting behavior evolved in the thirty or so years in which children have been watching television. Attentional inertia in fact appears to be highly useful as one means to maintain attention to a source of information even when that source is not always continuous. Nvertheless, attentional inertia does appear to be

a passive component on which television, as a dynamic, meaningful source of stimulation does capitalize (pun intended).

Apropos to the theme of this symposium, we have also studied the relationship between visual attention and formal attributes of television. In a fashion similar to the way we rate children's attention to television, using a computer, we rated the presence and absence of a large variety of simple attributes of children's TV programs, such as types of voices, camera techniques, and so on. Since we now had stored in the computer the times of onset and offset of each attribute as well as the times of onset and offset of each child's visual attention, we could analyze the time-locked relationship of attributes and attention. If a child was not looking at the TV during the onset of a given attribute, we could determine whether the attribute tended to elicit or inhibit looking. If the child was looking at the TV at the time of the attribute onset, we could determine whether the attribute tended to maintain or terminate further looking. These analyses indicated that certain attributes were positively related to attention whereas others were negatively related. Attributes that were positively related to attention included peculiar voices, children's voices, women's voices, sound effects, auditory changes, applause, laughter, camera cuts, animation, puppets, and movement. Attributes that were negatively related to attention included men's voices, extended pans and zooms, and animals (Anderson & Levin, 1976; Levin & Anderson, 1976; Alwitt, Anderson, Lorch, & Levin, unpublished

manuscript).

Now, let me summarize our major research conclusions to date: first, remember that children's attention to television is strongly affected by the viewing environment. Toys, for example, can be powerful distractors. Second, and very important for our theoretical position on TV viewing, is our finding that the minute to minute comprehensibility of the TV program, from the point of view of the child, is a powerful determinant of whether the child maintains attention. Third, attentional inertia operates to maintain both looking at the TV as well as nonlooking activities. Fourth, formal attributes of television serve to elicit, inhibit, maintain, and terminate looking at the TV.

We are now in a position to state our theoretical point of view about young children's television viewing as well as reinterpret the meaning of our attribute results. We argue that for the preschool child, a primary driving force of attention to television is the child's motivation to understand what he or she is viewing. With TV viewing experience, children develop a sophisticated strategy which allows them to effectively divide their visual attention between television and other activities, such as toy play. This strategy depends heavily, we believe, on the children's use of attributes as cues to whether the current content is or is not informative. If the attribute signals informative content, the child pays full attention to the TV and actively attempts to understand the program. If the attribute signals incomprehensible or

perhaps redundant content, the child does not visually attend to the TV. Consider some of the attributes we have studied, for example, men's voices, women's voices, children's voices, and peculiar voices. Men's voices reliably keep children from looking at the TV if they are not already looking, and terminate looking if they already are. Children's voices, peculiar voices, and to a lesser extent, women's voices, elicit and maintain looking at the TV. We argue that the different effects of these attributes stem from the information which they provide the child about the likely comprehensibility of the content. On television, peculiar voices almost always mean content meant for children; content that is relatively concrete and therefore understandable. Similarly, children's voices and, to a much lesser extent, women's voices, are more likely to be associated on television with content understandable to young children than are men's voices. Men are present on television three times as frequently as women, and men's voices are present even more than that as voice-overs, for example, in advertisements and news documentaries. In general, men's voices seem to be predictive of content that is for adults, content that is abstract and difficult for a preschool child to understand. We suggest that with time, the child comes to learn these characteristics of the TV medium and employ them to direct attention. Of special importance are the audio attributes which can be monitored at a relatively superficial nonsemantic level as the child

engages in toy play or some other nonviewing activity. The existence of such nonsemantic levels of auditory attention has been extensively demonstrated by Moray, Treisman, Broadbent, and other researchers employing the dichotic listening paradigm. When the child who is superficially monitoring the audio detects an informative audio attribute, the child then pays full attention to the program. As the child becomes increasingly experienced with particular programs, we suggest that program-specific attributes are learned. Rapid learning of such program-specific format cues seems imminently reasonable. Consider, for example, how rapidly children learn the musical signatures which represent the characters of the musical fantasy "Peter and the Wolf."

The next slide is a schematic of our theory of children's attention to television. As you can see, it represents the child's cycles of attention from beginning a look to maintaining the look to beginning a pause and maintaining the pause. The factors which we believe to cause transitions from state to state are indicated on the arrows representing these transitions. Unfortunately, time does not permit me to justify for you all of these factors. Nevertheless, the schematic shows the complex multidetermined nature of children's television viewing. Rather than the simplistic linear ideas of children's passive TV viewing, the schematic shows that not only is attention to television affected by what happens on the TV set, but it is also determined by active cognitive processing by the child, and by the TV viewing environment which can facilitate

or inhibit alternative activities. It is true that attentional inertia is a passive component of the TV viewing process, but it must be seen as only one component, a component that is probably present in other daily information seeking activities. We believe television viewing can be seen as an example of the transactive cycles of human behavior cogently discussed by John Gibbs (1979) in the most recent issue of the American Psychologist. Gibbs argues that most significant human behavior consists of cycles of mental organization directing exploration and evaluation of the external environment, which in turn augment and provoke changes in mental organization.

Our thesis, then, is that children's television viewing is a transactional process that is probably not terribly different from other normal information processing activities. If a TV program is produced to be understandable to the child, and if it follows the attribute rules the child has acquired with TV viewing experience, then the program can indeed hold the child's attention, even in the face of a distracting environment. If, on the other hand, the child has virtually nothing else to do but watch TV, almost any TV program will appear to hold the child's attention. But these same principles would hold not only for television but for any other dynamic source of information, such as a parent telling the child a story.

We would like to make a final comment. Just because television viewing is similar to other information seeking

activities in which the child engages, one should not conclude that TV viewing is necessarily an activity that is good for children. A child leaves the television with information about the world, about the society in which he or she lives, about that society's expectations for the child. Every television program teaches, implicitly, if not explicitly. The information a child leaves the television with is only as good as the information the TV program provides.

Nevertheless, we would like to close with what we think is a note of reason in contrast to the increasingly hysterical outcry against television per se as a medium of information for children. Watching children watch television has left us only with respect for the subtleties of children's cognitive behavior and the active strategies which they employ to learn about their world.

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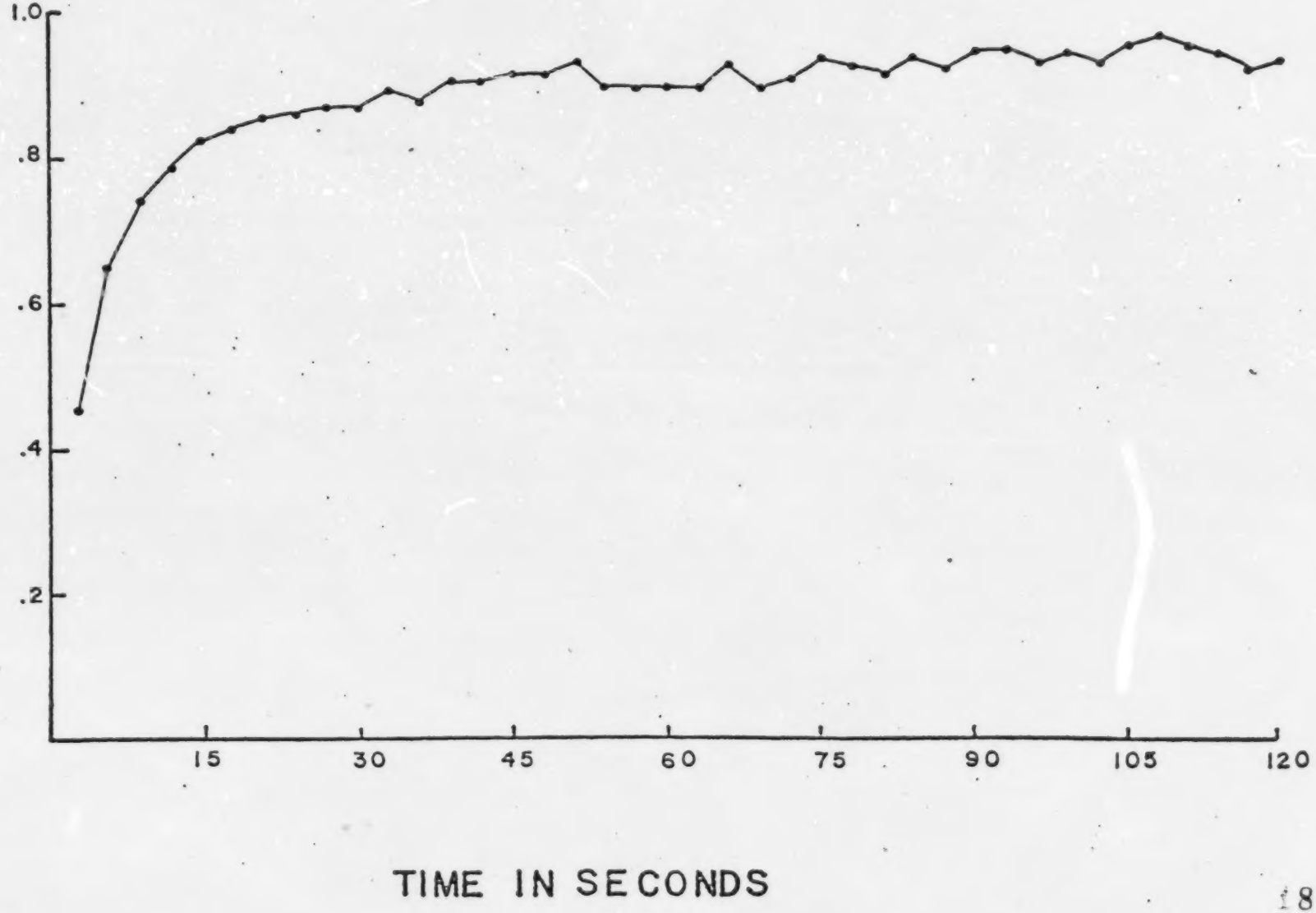
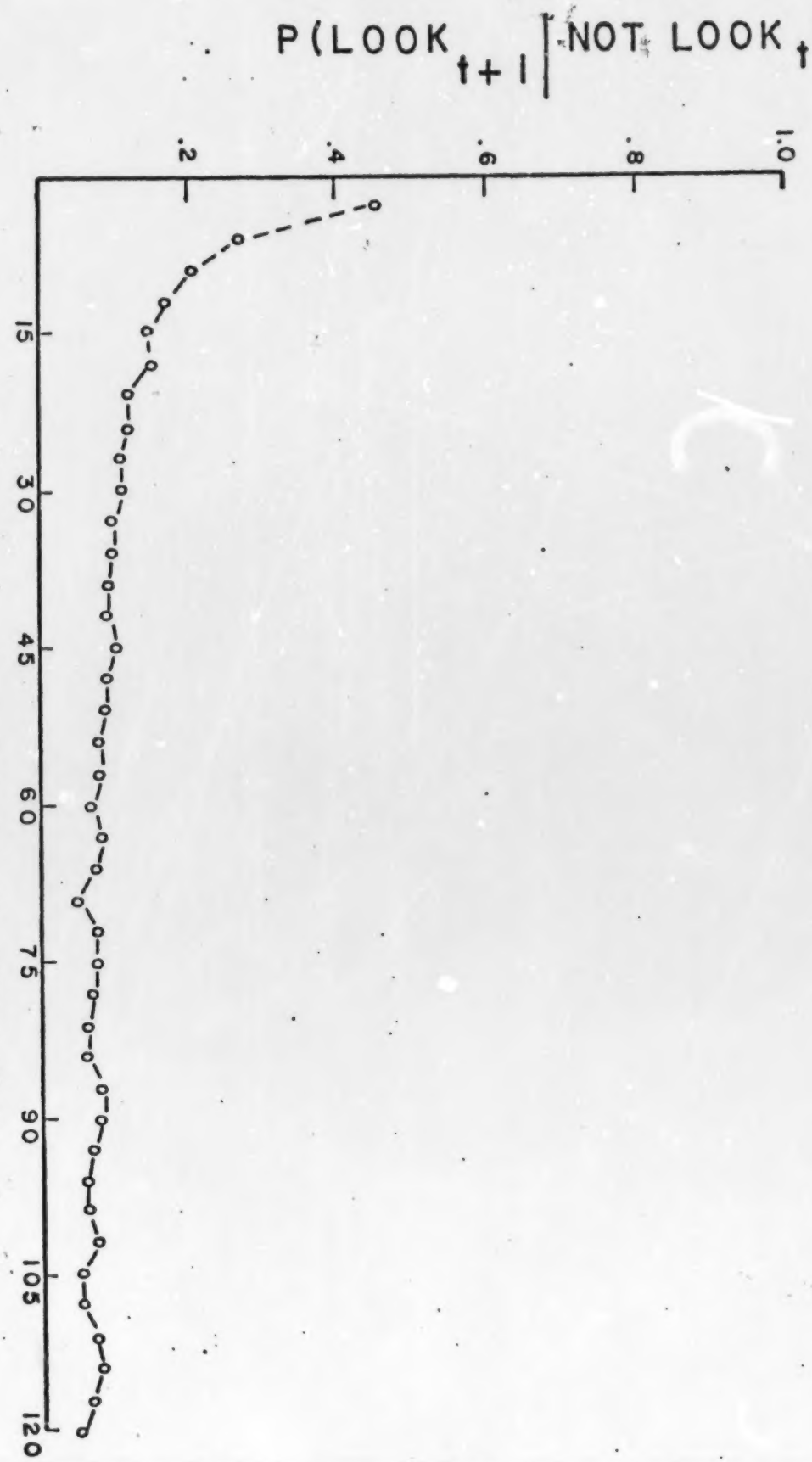
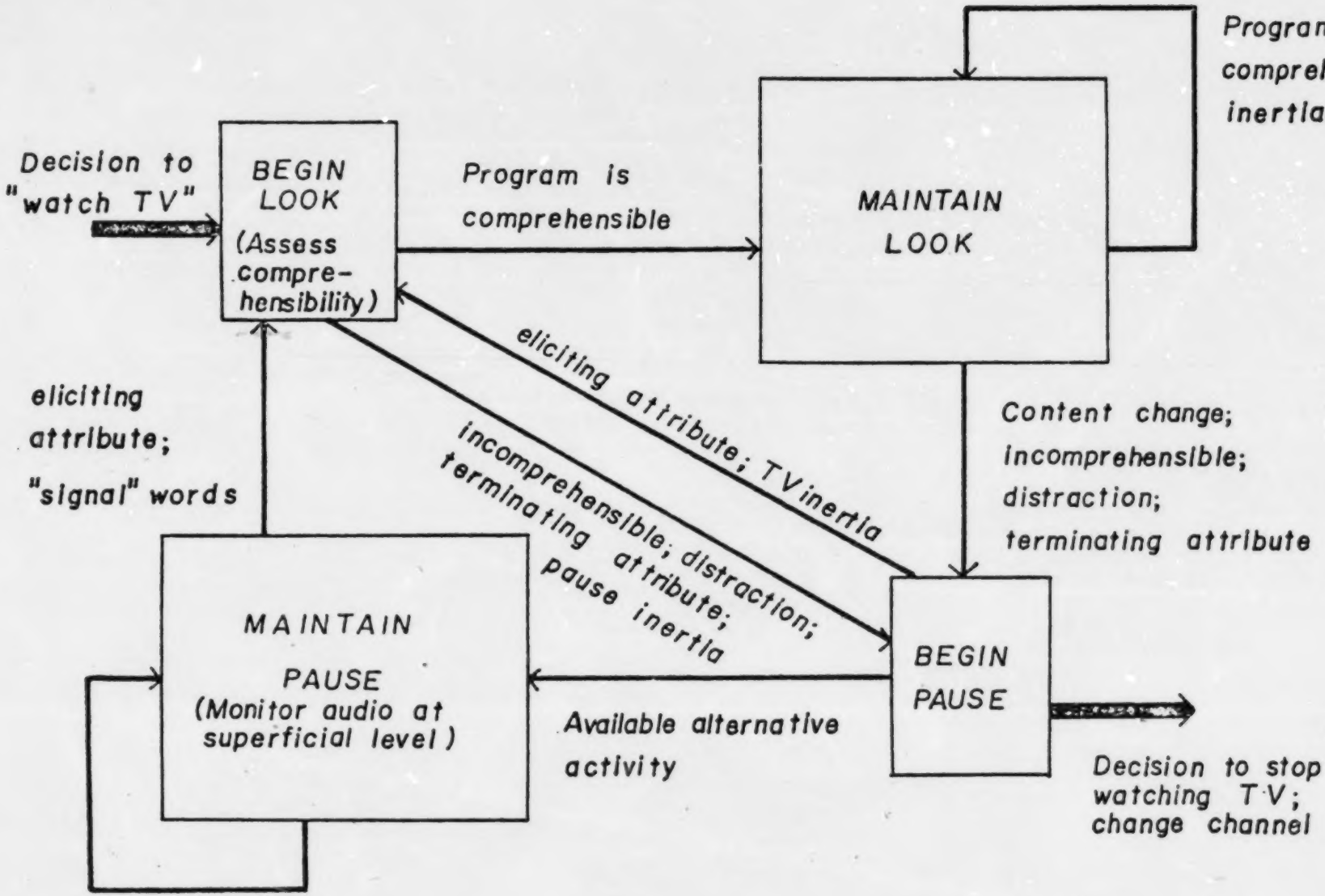


Figure 2. Conditional probability of continuing to look at television as a function of time since the look began.

Figure 3. Conditional probability of looking back at the television as a function of time since the end of the last look.




Decision to "watch TV"
BEGIN LOOK
(Assess comprehensibility)
Program is comprehensible
MAINTAIN LOOK
Program is comprehensible; inertia
eliciting attribute; TV inertia
incomprehensible; distraction; terminating attribute; pause inertia
eliciting attribute; "signal" words
Content change; incomprehensible; distraction; terminating attribute
MAINTAIN PAUSE
(Monitor audio at superficial level)
BEGIN PAUSE
Available alternative activity
Decision to stop watching TV; change channel
Pause inertia; inhibiting attribute